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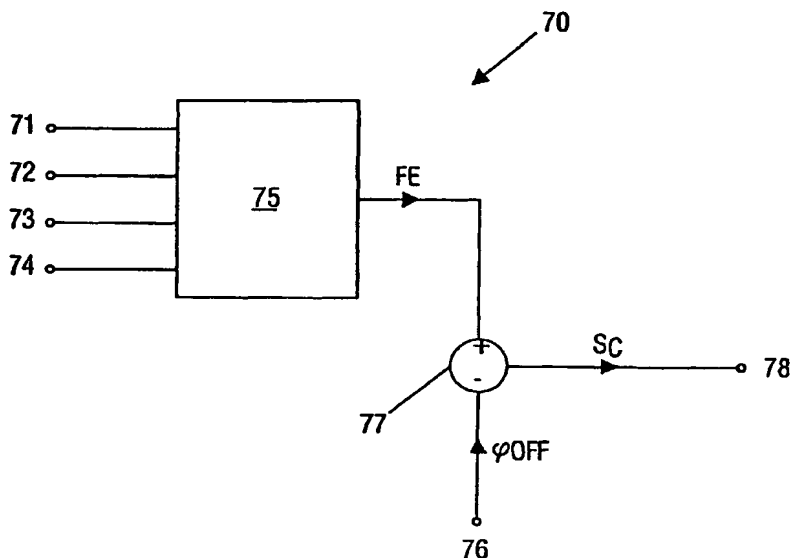
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[Continued on next page]

(54) Title: **OPTICAL PICKUP**



(57) Abstract: An optical disc drive (1) comprises an optical pickup (3) with a 4-quadrant photo-detector (20); an objective lens (14) mounted displaceably with respect to the photo-detector (20); an optical displacement actuator (30) for displacing the objective lens (14); and a servo controller (70) for controlling the focus actuator (30). The controller (70) receives respective detector signals (S1, S2, S3, S4) from the photo-detector (20). The controller (70) is adapted to process these detector signals to produce a focal error signal (FE) which is zero if these signals all have identical magnitude. The controller (70) is further adapted to subtract/add an offset parameter (ϕ_{off}) from/to said focal error signal (FE), and to provide the difference/sum as a control output signal.

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 Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 148 423 A (GLEIM GUENTER) 15 September 1992 (1992-09-15) column 6, line 43 -column 7, line 31; figures 1,2	1-5,8,9
X	EP 0 840 295 A (SONY CORP) 6 May 1998 (1998-05-06) column 7, line 17 - line 48; figure 5 abstract; figure 1	1,4-6,8, 9
X	US 5 748 584 A (MAEZAWA ETSUO) 5 May 1998 (1998-05-05) the whole document	1,4,5, 7-9
X	US 5 574 706 A (VERBOOM JOHANNES J ET AL) 12 November 1996 (1996-11-12) the whole document	1,2,4,5, 8,9
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 907 212 A (PHARRIS KENTON J ET AL) 6 March 1990 (1990-03-06) the whole document -----	1,4,5,8, 9

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INTERNATIONAL SEARCH REPORT

on patent family members

International Publication No

PCT/JP 03/01447

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5148423	A	15-09-1992	DE 3824039 A1	18-01-1990
			AT 80960 T	15-10-1992
			CN 1039919 A ,B	21-02-1990
			DE 58902327 D1	29-10-1992
			DK 67990 A	15-05-1990
			WO 9000797 A1	25-01-1990
			EP 0350939 A1	17-01-1990
			EP 0378650 A1	25-07-1990
			ES 2035459 T3	16-04-1993
			GR 3006012 T3	21-06-1993
			HK 8997 A	31-01-1997
			HU 53467 A2	28-10-1990
			JP 2726131 B2	11-03-1998
			JP 3502979 T	04-07-1991
EP 0840295	A	06-05-1998	JP 10134372 A	22-05-1998
			AU 725777 B2	19-10-2000
			AU 4364697 A	07-05-1998
			CN 1185001 A	17-06-1998
			EP 0840295 A2	06-05-1998
			US 6115333 A	05-09-2000
US 5748584	A	05-05-1998	JP 2783185 B2	06-08-1998
			JP 8263853 A	11-10-1996
US 5574706	A	12-11-1996	EP 0603968 A1	29-06-1994
			JP 6282861 A	07-10-1994
US 4907212	A	06-03-1990	NONE	